

VANCOMYCIN-RESISTANT ENTEROCOCCI (VRE)

Infection Control Guidelines for Long-Term Care Facilities

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Vancomycin-resistant enterococci (VRE) have emerged as a significant public health concern. According to the Centers for Disease Control and Prevention's (CDC) National Nosocomial Infections Surveillance System (NNIS), the proportion of enterococcal isolates resistant to vancomycin in participating hospitals increased from approximately 15% in the mid-1990's to 24% in 1998.

Vancomycin resistance in enterococci has been superimposed on the increasing prevalence of high-level enterococcal resistance to penicillin and aminoglycosides, making it difficult to treat patients with infections caused by these microorganisms. The potential also exists for VRE to transfer vancomycin resistance genes to other gram-positive organisms, including staphylococci. Recently, there have been a few documented cases of intermediate resistance to vancomycin in methicillin-resistant *Staphylococcus aureus* (MRSA). With MRSA already a substantial problem for long-term care facilities (LTCFs), MRSA with vancomycin resistance would be devastating.

Enterococci are gram-positive bacteria that are part of the normal flora of the gastrointestinal and female genital tracts. Most infections caused by these organisms have been attributed to the patient's endogenous flora. However, recent studies indicate that VRE can be transmitted directly by patient-to-patient contact or indirectly by transient carriage on the hands of staff or through contaminated environmental surfaces and patient-care equipment.

Vancomycin use is a risk factor for infection and colonization with VRE and may increase the possibility of the emergence of vancomycin-resistant *S. aureus* (VRSA) and/or vancomycin-resistant *S. epidermidis* (VRSE). The CDC has provided recommendations for situations where the use of vancomycin is appropriate and where it is not (Attachment 1). This information should be made available to all of the facility's prescribers.

Because many residents of LTCFs are, or may become, infected or colonized with VRE, the establishment of a VRE protocol by LTCFs should be considered a priority.

Infection or colonization with VRE is not grounds for denial of admission to a long-term care facility. In 1989, 105 CMR 150.000: The Rules and Regulations for the Licensing of Long-Term Care Facilities were amended. Section 105 CMR 150.003(D)(1)-(3)(a-d), the section that allowed long-term care facilities to restrict admission to persons who had a "contagious disease in a communicable form . . . ", was **deleted in its entirety**.

Infectious Agent: Enterococci with resistance to vancomycin

Reservoir: Humans

Mode of Transmission: VRE can be transmitted directly by patient-to-patient contact or indirectly through contact with transiently colonized hands of staff or through contaminated environmental surfaces and patient-care equipment. Cleaning and disinfection of these items is necessary to reduce bacterial load and risk of transmission.

Incubation Period: Variable

VRE Infection: Invasion and multiplication of VRE in a body site accompanied by clinical signs and symptoms of infection (e.g. fever, lesions, wound drainage) or increased white blood cell count. **Infection warrants treatment.**

VRE Colonization: VRE colonization of bowel, skin, wounds, etc. can persist indefinitely with no clinical signs or symptoms of illness or infection.

Risks for acquiring VRE:

- severe illness
- severe underlying disease or immunosuppression (includes stays in ICUs and on oncology and transplant wards)
- intraabdominal or cardio-thoracic surgery
- indwelling urinary or central venous catheter
- prolonged hospital stay
- treatment with multiple antibiotics and/or vancomycin.

Diagnosis: Enterococci can be identified by using colonial morphology, a Gram stain, and a pyrrolidonyl arylamidase (PYR) test. Vancomycin susceptibility should be determined for enterococci isolated from blood, sterile body sites, and other sites, as clinically indicated.

Treatment: Issues relating to the treatment of VRE infection or colonization, including what antibiotics are appropriate, should be addressed by the patient's physician.

Control: As with MRSA, an individual with VRE can be either infected (showing clinical signs/symptoms, e.g., fever, lesions, wound drainage) or colonized (VRE is present in or on a body site without clinical signs/symptoms), and in either case, is capable of transmitting it to others.

Precautions: Isolation precautions (e.g. contact precautions) should be implemented according to the type of VRE infection or colonization. Standard precautions should be practiced at all times, regardless of VRE status.

Gloves: Gloves should be worn when providing care that involves personal contact (e.g. changing clothes, toileting, bathing) or contact with items that may be contaminated by VRE (e.g. bedding). Remove the gloves after caring for the patient and wash hands with an antibacterial soap before leaving the room. Gloves alone do not guarantee prevention of transmission.

Gowns: A gown should be worn if the caregiver's clothing is likely to have substantial contact with a VRE-positive resident in the course of care (e.g. bed baths, lifting). The gown should be removed immediately after providing care and the caregiver's hands should be washed prior to leaving the resident's room. A gown is not necessary for feeding or measuring vital signs.

Masks: VRE is not transmitted through the airborne route. However, masks are recommended during activities likely to generate splashes or sprays of blood or other body fluids. If extensive splattering is expected, protective eyewear may be warranted.

Hand hygiene: Strict adherence to hand hygiene protocols must be maintained. Staff and visitors should wash their hands with an antimicrobial soap (soap is not as effective in removing transient carriage) after glove removal, after patient care, and prior to leaving the room of a VRE-positive resident. Hands should be dried with a dry, disposable paper towel, and faucets should be turned off using a paper towel. Hands should be washed after touching body fluids, secretions, excretions, and contaminated items, whether or not gloves are worn. Educate staff and residents about the importance of hand hygiene. If residents can not wash their own hands after bathroom use, their hands should be washed for them. Recent studies have shown that the use of a waterless, alcohol-based hand antiseptic is as effective as antimicrobial soaps, is not harmful to hands, and may improve compliance. However, these products are not a substitute for handwashing when hands are visibly contaminated.

Linens: Minimal handling of soiled linens should be stressed. Staff involved with stripping beds or otherwise having direct contact with these materials should wear gloves and gowns. Soiled linens should be bagged in the resident's room.

Environmental Cleaning: VRE is capable of prolonged survival on hands, gloves, and environmental surfaces. Routine cleaning of the resident's

surroundings should be done **daily** to reduce bacterial load. Sharing of noncritical equipment (such as electronic thermometers, blood pressure cuffs, and intravenous poles) should not be permitted. Cleaning supplies should be dedicated to the room. Discard all contaminated disposable supplies after the resident leaves the room, and keep disposable supplies in the room to a minimum. Only plastic, vinyl, or leather-coated furniture that can be wiped down with a disinfectant should go in the room. Bath tubs, whirlpools, and hydrotherapy tubs should be cleaned and disinfected after each use. Solutions of 5.25% sodium hypochlorite (household bleach) diluted to 1:64 with water (1/4 cup bleach to one gallon of water) are acceptable for disinfection of environmental surfaces. Always consult your facility's housekeeping protocols first. There are several other disinfectant products on the market. However, only those that are registered by the Environmental Protection Agency (EPA) as a hospital-grade disinfectant should be used. A list of EPA registered disinfectants may be obtained by calling the Antimicrobial Complaint System at 1-800-447-6349 or by visiting the National Antimicrobial Information Network (NAIN) at <http://nain.orst.edu/lists.htm>. There are four lists: List A-agents, described as sterilants; List B-agents, effective against Mycobacterium (TB); List C-agents, effective against HIV-1; and List D-agents, effective against Hepatitis B Virus and HIV-1. The lists are maintained by Texas Tech University, which also operates an EPA sponsored hotline, and are updated annually.

Room Placement: Resident placement decisions need to consider the risk/benefit and degree of disruption from changes in room assignment (considering all residents affected by a decision), the fact that colonization with VRE can persist indefinitely, and the resident's level of interaction within the facility. Residents who are incontinent of infectious stool or urine or have infectious wound drainage are at greatest risk for being a source of transmission or cross-contamination. When placing residents with VRE in multiple-bed rooms, their roommates should not be severely immunocompromised or have indwelling lines or open wounds. In addition, VRE-positive residents who are incontinent of infectious stool or urine are likely to contaminate the environment significantly. The order of preference for room assignment of VRE-positive residents should be:

- 1) assign to a private room,
- 2) cohort with other known VRE cases,
- 3) cohort with other resident(s) who are not at increased risk for infection (e.g. those without indwelling lines, open wounds, etc.) **and** who are not MRSA positive.

Group Activities: A long-term care facility is generally considered a resident's home. A VRE-positive resident should be allowed to ambulate, socialize as usual, and participate in therapeutic and group activities as long as contaminated body substances are contained. When residents leave their room, they should have their hands cleaned. In addition, they should have clean, dry dressings and wear clean clothes. Where appropriate, enhanced barrier protection to contain a contaminated body substance is preferred over restriction of the resident.

Staff education: All staff working in a LTCF should receive education and training regarding VRE and the importance of control. Education should be provided on a regular basis, at least annually. Additionally, inservice training in infection control should be provided in response to any increase in VRE frequency within the facility.

Discontinuation of Isolation Precautions: Criteria for discontinuing isolation precautions for patients with VRE have not been well defined, partly because:

- 1) VRE colonization can persist indefinitely and VRE can be shed intermittently,
- 2) Enterococci are normal bowel flora,
- 3) Effective measures to eradicate VRE colonization have not been established,
- 4) Screening cultures may not be a reliable indicator of the presence or absence of VRE, and
- 5) Repeat cultures are expensive and may not be cost-effective.

Therefore, **each facility should develop its own policy based upon the resident and the risk of transmission that the resident may pose for the rest of the facility.** In the CDC publication *Recommendations for Preventing the Spread of Vancomycin Resistance*,

there is an example of such a policy which includes the requirement for VRE-negative results on at least three consecutive occasions (from cultures taken at least one week apart) from multiple body sites (including stool, rectal swab, perineal area, axilla or umbilicus, and wound, Foley catheter, and/or colostomy sites, if present).

Tracking and Notification of Providers: All cases of VRE should be documented and kept on file with the facility's infection control practitioner. This information should become a permanent part of the resident's chart and be included on any discharge and/or transfer papers. The resident's primary care provider should be notified when the resident is identified as VRE-positive. In addition, acute care facilities should notify the receiving agency of all VRE-positive transfers.

OUTBREAK CONTROL

An outbreak is the occurrence of a disease or condition in excess of what is normally expected. Each case of VRE in a resident should be closely monitored as previously described. However the following should be conducted in outbreak situations:

1. Individual cases of VRE are not reportable to the Massachusetts Department of Public Health. However, in outbreak situations, notify both the Department of Public Health, Division of Health Care Quality (DHCQ) at (617) 753-8000 and the local board of health. You should also contact the Division of Epidemiology and Immunization at (617) 983-6800 for additional advice.
2. Reinforce infection control procedures throughout the facility (e.g., handwashing and

isolation precautions). Pay special attention to those VRE-positive residents who have diarrhea. Both gown and glove use should be instituted when caring for such residents and their environments.

3. Establish a cohort of VRE-positive residents. Staff should be restricted to caring for **only one cohort** of residents. **Restrict floating of staff.**

4. Consult with the facility's infection control practitioner regarding the culturing of those staff with chronic skin and nail problems. Hand and rectal swabs from these workers may be appropriate. Remove any VRE-positive staff from caring for any VRE-negative residents *unless* it can be clearly documented that they have been properly educated and can maintain the necessary level of hygiene to prevent transmission.

5. Conduct an epidemiologic investigation to the best of your ability. Focus on collecting the following information for each VRE-positive patient (case):

- (a) the patient's location in the facility (before/after cohorting)
- (b) date(s) of the patient's original and most recent admissions to the facility
- (c) date(s) of recent admissions/discharges to/from other acute and long-term care facilities
- (d) which caregivers in the current facility had "hands-on" contact with the patient
- (e) body site(s) of infection/colonization of the patient
- (f) age, sex, and ethnicity of the patient
- (g) diagnosis and underlying conditions of the patient
- (h) treatment given to the patient

6. It is not necessary to restrict admissions or discharges to the facility unless it is determined (through a complaint registered with DHCQ or from the results of the facility's annual certification survey) that the facility is not following the proper protocols for those residents who are currently in the facility.

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Attachment 1

Prudent Vancomycin Use

The following has been recommended by the Centers for Disease Control and Prevention for the prudent use of vancomycin:

Situations in which the use of vancomycin is appropriate or acceptable:

- For treatment of serious infections caused by beta-lactam-resistant gram-positive microorganisms. Vancomycin may be less rapidly bactericidal than are beta-lactam agents for beta-lactam-susceptible staphylococci.
- For treatment of infections caused by gram-positive microorganisms in patients who have serious allergies to beta-lactam antimicrobials.
- When antibiotic-associated colitis fails to respond to metronidazole therapy or is severe and potentially life-threatening.
- Prophylaxis, as recommended by the American Heart Association, for endocarditis following certain procedures in patients at high risk for endocarditis.
- Prophylaxis for major surgical procedures involving implantation of prosthetic materials or devices at institutions that have a high rate of infections caused by MRSA or methicillin-resistant *S. epidermidis*.

Situations in which the use of vancomycin should be discouraged:

- Routine surgical prophylaxis other than in a patient who has a life-threatening allergy to beta-lactam antibiotics.
- Empiric antimicrobial therapy for a febrile neutropenic patient, unless initial evidence indicates that the patient has an infection caused by gram-positive microorganisms and the prevalence of MRSA infections in the facility is substantial.
- Treatment in response to a single blood culture positive for coagulase-negative staphylococcus, if other blood cultures taken during the same time frame are negative (i.e., if contamination of the blood culture is likely). Because contamination of blood cultures with skin flora (e.g., *S. epidermidis*) could result in inappropriate administration of vancomycin, phlebotomists and other personnel who obtain blood cultures should be trained to minimize microbial contamination of specimens.
- Continued empiric use for presumed infections in patients whose cultures are negative for beta-lactam-resistant gram-positive microorganisms.
- Systemic or local prophylaxis for infection or colonization of indwelling central or peripheral intravascular catheters.
- Selective decontamination of the digestive tract.
- Eradication of MRSA colonization.
- Primary treatment of antibiotic-associated colitis.
- Routine prophylaxis for very low-birthweight infants (i.e. infants who weigh < 1500 g [3 lbs. 4 oz]).
- Routine prophylaxis for patients on continuous ambulatory peritoneal dialysis or hemodialysis.
- Treatment (chosen for dosing convenience) of infections caused by beta-lactam-sensitive gram-positive microorganisms in patients who have renal failure.
- Use of vancomycin solution for topical application or irrigation.

Adapted from the CDC's Recommendations for Preventing the Spread of Vancomycin Resistance-Recommendations of the Hospital Infection Control Practices Advisory Committee (HICPAC), MMWR 1995;44(RR-12):3-4.